Class 3 Permit Modification for Corrective Action Complete with Controls Solid Waste Management Unit 76, Mixed Waste Landfill

Public Meeting Station 3 Fact Sheet

Corrective Measures Implementation Plan
The Corrective Measures Implementation (CMI) Plan incorporates the final remedy selected by the New Mexico Environment Department (NMED) and presents details for: deployment of an evapotranspirative (ET) cover (construction specifications, design drawings, and detailed construction plan); the regulatory and technical basis for the corrective measures; description of the characteristics of Solid Waste Management Unit (SWMU) 76, Mixed Waste Landfill (MWL); and performance monitoring for the cover following deployment. A comprehensive fate and transport modeling report is also included as Appendix E, as required by the Final Order, with triggers for long-term monitoring.

The ET cover meets the Resource Conservation and Recovery Act (RCRA) and federal and state regulatory requirements in 40 Code of Federal Regulations (CFR) 264.310 for protection of the environment, as follows:

- Water migration is minimized through the cover. The 3-foot-thick soil cover with native vegetation minimizes water migration into waste disposal cells.
- Maintenance is minimized by using a monolithic soil layer in the cover. Individual layers of natural and synthetic materials, such as those used in traditional RCRA covers, are rigid and would require extensive maintenance and repair due to material failure and to eventual degradation.
- Cover erosion is minimized by designed erosion control measures. The cover surface is centrally crowned with a gentle, 2% slope. The topsoil layer contains 3/8-inch crushed gravel, 25% by volume, and is vegetated with native grasses.
- Subsidence (sinking of the surface as underlying soil compacts over time) is accommodated by using a soft cover comprised of native soil processed to meet design specifications (no rocks or material larger than 2-inches, and specific gradation, soil classification, and soil property specifications) and placed/compacted in sequential lifts during construction. During the long-term care period, soil will be added to the cover if needed to repair erosion and subsidence if it occurs.
- Permeability of the cover soil is less than or equal to the permeability of MWL subsurface soil.

Performance of the ET cover system is integrated with natural site conditions that ensure effective performance while requiring minimal maintenance. The natural site conditions that enhance ET cover performance include:

- Extremely low precipitation and high potential evapotranspiration (i.e., process of transferring moisture from the earth to the atmosphere by evaporation of water and transpiration from plants).
- Negligible recharge to groundwater. Chloride data collected from boreholes at SWMU 76, MWL indicate significant rainfall has not percolated beyond the upper 20 feet of soil for tens of thousands of years (Peace et. al. September 2002).
- A 500-foot thick vadose zone between the disposal area and groundwater.
- Low potential for volcanic and seismic activity, with low hazard potential (Clary et. al. 1984).

Corrective Measures Implementation Plan – Fate and Transport Model
The CMI Plan also included a report documenting fate and transport modeling, which described a computer-modeling process that Department of Energy (DOE) and Sandia Corporation (Sandia) used to estimate and predict the potential movement of contaminants in the subsurface.
soils beneath SWMU 76, MWL under various scenarios. NMED required DOE and Sandia to perform the modeling to address public concerns and uncertainty associated with the MWL inventory and characterization data, and to provide a technical basis for monitoring requirements and trigger levels to be included later in the Long-Term Monitoring and Maintenance Plan (LTMMPP).

- A probabilistic modeling approach and very conservative assumptions and input parameters were used to provide a comprehensive performance assessment of SWMU 76, MWL.
- Uncertainties inherent in the natural system and input data were addressed by:
  - Performing sensitivity analyses to identify the parameters and processes that have the greatest impacts on modeling results.
  - Running at least 100 realizations for each scenario defined in the performance assessment using a range of input parameters.
  - Simulated results were directly compared to measured field values to test and calibrate the model for scenarios when data were available.
  - Running the model for a 1,000-year period.
- SWMU 76, MWL investigation results and inventory information were used as inputs to the model.
- Contaminants included in the model: tritium, americium-241, cesium-137, cobalt-60, plutonium-238 plutonium-239, radium-226, radon-222, strontium-90, thorium-232, uranium-238, lead, cadmium (not in inventory, but added to modeling effort), and tetrachloroethene (PCE) used as a proxy for all potential volatile organic compounds because of its high mobility in the environment.

The CMI Plan Fate and Transport Modeling Report addressed and improved upon previous modeling efforts, which were more focused on single aspects and/or contaminants. The following information summarizes the final conclusions of the report.

- Site conditions at SWMU 76, MWL over the next 1,000 years will remain protective of human health, the environment, and groundwater.
- The proposed alternative 3-foot thick vegetative soil ET cover (without biointrusion barrier) will minimize infiltration of water into the disposal areas and meet Environmental Protection Agency-prescribed technical equivalency criteria for RCRA landfills under both present and future conditions.
  - When the model results could be directly compared to measured field values, as in the case for tritium and radon in air, in most cases the model results were higher than the measured results (i.e., model results were conservative).
  - No radionuclides (including uranium-238) or heavy metals would reach the groundwater within the 1,000-year time period modeled.
  - Based on the modeling performed, it is possible that various parameters (tritium and radon in air, and PCE in groundwater) could exceed regulatory standards at the site. However, the modeling demonstrates that these exceedance scenarios are very unlikely and can be prevented through long-term monitoring and controls.

To address the very low potential for regulatory exceedances, long-term monitoring requirements were developed to provide early detection of changing conditions. Protective trigger levels were also established to require the timely implementation of appropriate corrective action if monitoring results exceed trigger levels. This monitoring and trigger level process, documented in the MWL LTMMPP, ensures the long-term protection of groundwater, human health, and the environment.

The proposed monitoring was incorporated in the MWL LTMMPP and implemented on January 8, 2014. Annual Long-Term Monitoring and Maintenance and 5-Year Reevaluation Reports will document results and allow for public review and input.

References